

WHAT IS CLAIMED IS:

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1 1. A hard disk drive (HDD) enclosure comprising:
2 a metal housing adapted to couple to and substantially enclose HDD
3 components, the metal housing having sidewalls extending upward from a lower
4 base having an opening therein, an upper portion of the sidewalls defining an
5 opening through which the HDD components fit into the metal housing;
6 a feedthrough arrangement having a flange in the opening in the lower base
7 and hermetically sealing the opening, with a plurality of connectors extending
8 through the flange, each connector forming a hermetic seal with the flange and
9 adapted to pass electrical signals between the HDD components and a circuit
10 outside of the metal housing; and
11 a metal cover laser welded to the upper portion of the sidewalls to close the
12 opening through which the HDD components fit and hermetically sealing the metal
13 housing.

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1 2. The HDD enclosure of claim 1, further comprising a gas sealed in the
2 metal housing and including at least one of: a low density gas and a low-humidity
3 gas.

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1 3. The HDD enclosure of claim 1, further comprising:
2 an inside cover below the metal cover and between the sidewalls; and
3 a non-hermetic seal between the inside cover and the metal housing.

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1 4. The HDD enclosure of claim 3, further comprising an adhesive
2 configured and arranged to couple the inside cover to the metal cover and to hold
3 the metal cover in place during a laser welding process for welding the metal cover
4 to the metal housing.

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1 5. The HDD enclosure of claim 4, further comprising a damping plate
2 coupled to the metal cover and configured and arranged to dampen vibration from
3 an HDD in the metal housing.

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1 6. The HDD enclosure of claim 1, wherein at least one of the metal
2 housing and the metal cover is includes a substantially eutectic aluminum/silicon
3 alloy.

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1 7. The HDD enclosure of claim 6, wherein the metal housing is a
2 substantially eutectic aluminum/silicon alloy that, upon laser welding to the metal
3 cover, solidifies after the laser-welded portion of the metal cover solidifies.

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1 8. The HDD enclosure of claim 1, wherein the lower base and the
2 sidewalls are formed using at least one of: cold forging and die casting.

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1 9. The HDD enclosure of claim 1, wherein the metal housing is cold
2 forged Aluminum.

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1 10. The HDD enclosure of claim 9, wherein the metal housing includes
2 material selected from the group of: 6061 Aluminum and 6063 Aluminum.

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1 11. The HDD enclosure of claim 10, wherein the metal cover is 4047
2 Aluminum.

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1 12. The HDD enclosure of claim 1, wherein the metal housing is die-cast
2 Aluminum.

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1 13. The HDD enclosure of claim 12, wherein the die-cast Aluminum
2 includes at least one of: A413 Aluminum and 413 Aluminum.

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1 14. The HDD enclosure of claim 13, wherein the metal cover includes at
2 least one of: 4047 Aluminum and 6061 Aluminum.

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1 15. The HDD enclosure of claim 1, wherein the feedthrough flange is
2 soldered to the metal housing.

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1 16. The HDD enclosure of claim 1, wherein the feedthrough flange is laser
2 welded to the metal housing.

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1 17. The HDD enclosure of claim 1, wherein the feedthrough flange and the

metal housing have substantially similar expansion coefficients.

18. The HDD enclosure of claim 1, further comprising a temperature sensor circuit configured and arranged to detect the temperature in the metal housing and to adjust operational parameters of the HDD as a function of the detected temperature.

19. The HDD enclosure of claim 1, wherein at least one of the feedthrough connectors, feedthrough flange and metal housing is plated.

20. The HDD enclosure of Claim 1, wherein the metal housing includes at least one fastener arrangement adapted to couple HDD components to the metal housing and completely within the metal housing.

21. A sealed electronic device enclosure comprising:
a metal housing coupled to and substantially enclosing the electronic device at an interior surface thereof and having a feedthrough opening therein, the interior surface including material selected from the group of: cold forged Aluminum and die cast Aluminum;
a feedthrough arrangement extending through the feedthrough opening in the metal housing and adapted to pass electrical signals between the electronic device and a circuit outside of the metal housing, the feedthrough arrangement having a metal flange coupled to the metal housing and hermetically sealing the feedthrough

10 opening;
11 a metal cover laser welded to the metal housing and
12 a low-humidity gas sealed in the metal housing by the feedthrough
13 arrangement and the metal cover.

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1 22. The sealed electronic device enclosure of claim 21, wherein metal
2 housing includes a eutectic aluminum alloy.

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1 23. The sealed electronic device enclosure of claim 21, further comprising
2 HDD components sealed in the metal housing by the feedthrough arrangement and
3 the metal cover.

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1 24. The sealed electronic device enclosure of claim 23, wherein a low-
2 density gas is sealed in the metal housing to reduce disturbance of an HDD head
3 flying near an HDD disk surface, relative to the disturbance that would exist with
4 standard pressure air sealed in the metal housing.

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1 25. A hermetically-sealed hard disk drive (HDD) arrangement comprising:
2 a metal housing adapted to couple to and substantially enclose HDD
3 components, with sidewalls extending upward from a lower base having an opening
4 therein, an upper portion of the sidewalls defining an opening through which the
5 HDD fits into the metal housing;
6 HDD components fastened to the metal housing;

7 a feedthrough arrangement having a flange in the opening of the lower base
8 and forming a hermetic seal therewith, with a plurality of connectors extending
9 through the flange, each connector forming a hermetic seal with the flange and
10 adapted to pass electrical signals between the HDD components and a circuit
11 outside of the metal housing;

12 a first cover over and enclosing the HDD components in the metal housing;

13 a non-hermetic seal between the first cover and the housing and adapted to
14 seal the HDD components in the housing; and

15 a metal cover over the first cover, laser welded to an upper portion of the
16 sidewalls and hermetically sealing the upper portion of the housing, at least a
17 portion of the laser welded metal cover and metal housing including a substantially
18 eutectic aluminum-silicon alloy.

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1 26. A computer system comprising:

2 a central processor;

3 HDD components sealed in a metal housing adapted to couple to and
4 enclose the HDD components in a low-humidity gas environment, the metal housing
5 having sidewalls extending upward from a lower base and a metal cover welded to
6 an upper portion of the sidewalls to seal the metal cover to the sidewalls;

7 a communications link coupled and adapted to pass signals between the
8 processor and the HDD; and

9 a feedthrough arrangement extending through the metal housing and
10 configured and arranged to pass signals between the HDD components and the

communications link, the feedthrough arrangement having a flange coupled to an opening in the lower base of the metal housing and forming a hermetic seal therewith, with a plurality of connectors extending through the flange, each connector forming a hermetic seal with the flange and adapted to pass the signals through the metal housing.

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27. A method for manufacturing a hard disk drive (HDD) enclosure, the method comprising:
forming a metal housing adapted to couple to and substantially enclose an HDD, with sidewalls extending upward from a lower base having an opening therein, and with an upper portion of the sidewalls defining an opening through which the HDD fits into the metal housing;
coupling a flange of a feedthrough arrangement to the opening of the lower base and forming a hermetic seal therewith, the feedthrough arrangement having a plurality of connectors extending through the flange, each connector forming a hermetic seal with the flange and adapted to pass electrical signals between the inside and outside of the metal housing;
inserting a HDD components into the metal housing, fastening the HDD components to the metal housing and connecting the HDD components to the plurality of connectors; and
laser welding a metal cover to an upper portion of the sidewalls to seal the open upper portion of the metal housing, the metal cover and the feedthrough arrangement hermetically sealing the HDD components in the metal housing.

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1 28. The method of claim 27, wherein forming a metal housing includes at
2 least one of: cold forming a metal housing and die casting a metal housing.

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1 29. The method of claim 27, further comprising coupling a first cover over
2 the HDD components and between the sidewalls and wherein welding a metal cover
3 to an upper portion of the sidewalls includes adhering the metal cover to the first
4 cover to hold the metal cover in place while subsequently welding the metal cover to
5 the upper portion of the sidewalls.

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1 30. The method of claim 27, wherein welding a metal cover to an upper
2 portion of the sidewalls includes welding a metal cover including a metal having a
3 composition that is substantially a eutectic alloy of aluminum and silicon.

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1 31. The method of claim 30, wherein welding the metal cover to an upper
2 portion of the sidewalls includes laser welding the metal cover to the sidewalls by
3 directing a laser to surfaces of both the metal cover and the sidewalls.

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1 32. The method of claim 31, wherein laser welding the metal cover to the
2 sidewalls includes directing the laser beam to a junction between the metal cover
3 and the sidewalls with a majority of the laser beam impinging upon the sidewalls,
4 heating the sidewalls more than the metal cover and inhibiting the welded portion of
5 the sidewalls from solidifying until after the metal cover solidifies.

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1 33. The method of claim 27, further comprising:
2 sealing a gas consisting primarily of at least one of Helium, Hydrogen and
3 Methane in the metal housing with the metal cover and the feedthrough
4 arrangement.

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1 34. The method of claim 27, further comprising:
2 sealing air in the metal housing with the metal cover and the feedthrough
3 arrangement at a vacuum pressure of less than about $\frac{1}{2}$ atmosphere.